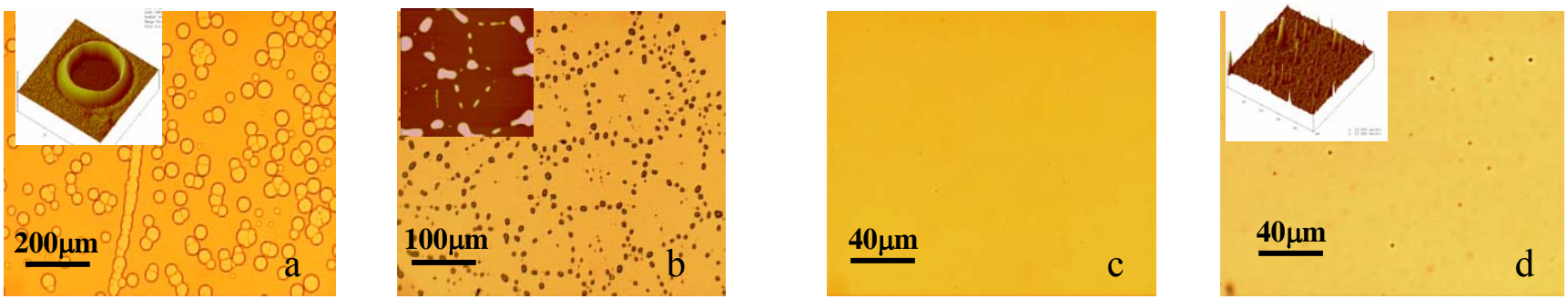
Control of the Wetting of Thin Polymeric Films
R. A. Weiss, Univ. of Connecticut, DMR 0304803

The stability of polymeric coatings is important in applications such as electronics, biomaterials, adhesives, tribology, lithography and composites. Dewetting of a coating exposes the underlying substrate, compromises the barrier properties of the coating and produces surface roughness and defects. This research examines the effect of bonded ionic groups on the dewetting of thin polymer film coatings on silica. Whereas, PS quickly dewets from the silica substrate above T_g, as manifest by the creation of holes in the film, the introduction of 2.5 mol% of lithium sulfonate groups profoundly suppress dewetting. No such hole formation occurs with the ionomer, even after 6 days annealing. Note that the dots in figure (d) are not holes, but unusual spike-like features (see inset AFM image), whose composition and origin are currently under investigation.

PS **Li-2.5SPS**



10 h **20 h** **20 h** **6 days**

Optical micrographs of ~ 30 nm thick spun-cast polymer (M_n = 4 kDa) films) annealed at 120°C.

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Education:
Two Ph.D. candidates, Mr. Hongying Zhang (2nd year) and Ms. Xiaowen Zhai (1st year) are being supported by this grant. One REU student, Mr. Terrence Latham, also was funded by an REU supplement to this grant.

Outreach:

- During the summer of 2003, the PI hosted a one-week visit by Prof. Kolbet and two undergraduate students from Lebanon Valley College (a predominantly undergraduate institution) during which the two. students were paired with graduate students and participated in experiments on the properties and structure of ionomers

- The PI and his students participated in an Open House (Fall, 2003) and Visitation Day (Spring, 2004) for college seniors interested in graduate school in which the students were shown demonstrations of how polymer science impacts on contemporary technology.

- The PI edited a children's book on polymeric materials: *'Fantastic Plastics'*, Newbridge Publ., NY. 2003.